

Application No. 09/681,403
Amendment dated September 8, 2003
Reply to Office Action of June 6, 2003

Amendments to the Claims

This listing of claims will replace all prior versions, and listing, of claims in the application:

Listing of Claims:

1-20. (Canceled)

21. (Currently Amended) An arrangement for a vehicle steering-wheel, said arrangement comprising:

a hub for fixing to a steering column;

a bowl-shaped element connected to the hub with at least one spoke, the at least one spoke further connecting the bowl-shaped element to a steering-wheel rim;

wherein the hub, the bowl-shaped element and the at least one spoke are integrally formed as a single material item;


the bowl-shaped element further comprising a lower part and an upper part that are integral with each other, the upper part having larger outer dimensions than the lower part and the parts being connected by a ledge extending substantially radially outwardly from the lower part to the upper part;

the bowl-shaped element further comprising a casing for enclosing an airbag and a means for inflating the airbag substantially disposed in the lower portion of the steering wheel for inflating the airbag in the event of a collision involving the vehicle; and

wherein the bowl-shaped element is substantially conical;
wall section of the bowl-shaped element at least partly forming a part of the means for inflating the airbag.

22. (Currently Amended) A vehicle steering-wheel arrangement, the arrangement comprising:
a hub configured for fixation to a steering column positioned in a vehicle;
a bowl-shaped element connected to the hub, the bowl-shaped element having at least one spoke for connecting the bowl-shaped element to a steering-wheel rim;

the bowl-shaped element establishing a casing that at least partially surrounds an airbag and an inflating mechanism substantially disposed in the lower portion of the steering wheel and that inflates the airbag in the event of a collision involving the vehicle;

 the bowl-shaped element further comprising a lower portion and an upper portion that are integral with each other, the upper portion having a larger outer dimension than the lower portion, the portions being connected by a ledge extending substantially, radially outwardly from the lower portion to the upper portion;

wherein the bowl-shaped element is substantially conical; and
a wall section of the bowl-shaped element forming, at least partly, a part of the inflating mechanism for the airbag.

23-26. (Canceled)

27. (Previously Added) The arrangement according to claim 21, wherein the airbag is arranged so that a major part of its mass extends along an inner periphery of the bowl-shaped element.

28. (Previously Added) The arrangement according to claim 27, wherein the arrangement is formed with a weight distribution and dimensioning of the steering-wheel, airbag and the means for inflating the airbag have a weight distribution and dimensioning such that a moment of inertia for the steering-wheel is obtained whereby vibrations in the steering wheel are minimized, the moment of inertia lying within a predetermined range.

29. (Previously Added) The arrangement according to claim 27, wherein the arrangement is formed with a weight distribution and dimensioning of the steering-wheel, airbag and means for inflating the airbag have a weight distribution and dimensioning corresponding to a torsion natural frequency f_T and a bending natural frequency f_B which are set in order to minimize mechanical perturbations in the steering-wheel.

30. (Previously Added) The arrangement according to claim further comprising at least two spokes connected by a reinforcing element, the reinforcing element being an integrated part and extension of the bowl-shaped element.

31. (Previously Added) The arrangement according to claim 21 wherein the steering-wheel rim is integrally formed with the at least one spoke.

32. (Previously Added) The arrangement according to claim 22, the at least one spoke further comprising a plurality of spokes, each of said spokes being interconnected with the hub and the bowl-shaped element.

33. (Previously Added) The arrangement according to claim 32, wherein the hub, the bowl-shaped element and the plurality of spokes are integrally formed with a steering-wheel rim.

34. (Previously Added) The arrangement according to claim 22, wherein the airbag is arranged with a majority of its mass located along an inner periphery of the bowl-shaped element.

35. (Previously Added) The arrangement according to claim 22, the arrangement being configured so that the steering-wheel, the airbag and the inflating mechanism for the airbag have a weight distribution and dimensioning corresponding to a moment of inertia for the steering-wheel, the moment of inertia lying within a predetermined range.

36. (Previously Added) The arrangement according to claim 22, the arrangement being configured so that the steering-wheel, the airbag and the inflating mechanism for the airbag have a weight distribution and dimensioning corresponding to a moment of inertia for the steering-wheel, the moment of inertia corresponding to a torsion natural frequency f_T and a bending natural frequency f_B which are set in order to minimize mechanical perturbations in the steering-wheel.

37. (Previously Added) The arrangement according to claim 22, the at least one spoke further comprising at least two spokes, each of the two spokes being connected by a reinforcing element, the reinforcing element comprising an extension of, and is an integrated part of the bowl-shaped element.

38. (Previously Added) The arrangement according to claim 22, wherein the steering-wheel rim is integrally formed with the at least one spoke.

39. (Previously Added) The arrangement according to claim 21 wherein when force is exerted upon the arrangement in the event of a collision, the steering-wheel is deformed at the ledge, thereby enabling the upper part of the to bend relative to the lower part of the shell.

40. (Previously Added) The arrangement according to claim 21 wherein the at least one spoke is deformed substantially insignificantly when force is exerted upon the arrangement in the event of a collision.

41. (Previously Amended) The arrangement according to claim 22 wherein when force is exerted upon the arrangement in the event of a collision, the steering-wheel is deformed at the ledge, thereby enabling the upper portion of the shell to bend relative to the lower portion of the shell.

42. (Previously Added) The arrangement according to claim 22 wherein the at least one spoke is deformed substantially insignificantly when force is exerted upon the arrangement in the event of a collision.

43. (New) A vehicle steering-wheel arrangement for being connected to a steering column, the vehicle steering-wheel arrangement comprising:

a steering wheel rim;

at least one spoke connected to the rim;

a generally bowl-shaped element between the spoke and steering column;

an integral wall of the bowl-shaped element having a gradually varying radius from an axis of the steering column over at least an arcuate portion of the wall extending along the axis;

an upper portion of the element including an upper opening about which the integral wall extends for receiving an airbag therein;

a smaller lower portion of the element including a lower opening about which the integral wall extends for receiving an inflating device therein, the lower portion including an upper end at which the lower opening opens to the upper opening;

a radial extending portion of the integral wall having a radially inner end at the upper end of the lower portion and a radially out^{er} end terminating at a lower end of the upper portion such that the radial extending wall portion is the only of the element wall portion extending radially between the upper and lower element portions and the lower opening opens to the upper opening without interfering wall-portions of the element therebetween.

44. (New) The vehicle steering-wheel arrangement of claim 43 wherein the varying radius arcuate wall portion is along the upper portion of the element.

will cancel 21, 22, 27-42

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45. (New) The vehicle steering-wheel arrangement of claim 44 wherein the spoke has a gradually varying radius similar to the wall portion to provide a continuous gradual curvature along and between the wall portion and spoke.

46. (New) The vehicle steering-wheel arrangement of claim 43 wherein the integral wall of the bowl-shaped element is of a unitary construction avoiding the need for securing the upper and lower element portions to each other in a distinct attachment operation.
